NASA Facts

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The "Face On Mars"

Background: The Viking Images

The Viking missions to Mars in the late 1970s produced more information about the Red Planet than had been gathered in all the previous centuries of study by Earth-bound astronomers and observers. The primary mission of the Viking program was to search for signs of life on the surface of Mars. Two landers containing sophisticated biological laboratories studied soil samples in a variety of tests which, it was hoped, would prove or disprove the existence of life.

The results of these tests indicated that Mars contained no life, at least at these landing sites. However, Viking gathered volumes of data on the weather, soil chemistry and other surface properties and mapped the surface using low-to-moderate resolution cameras on the two orbiters.

Shortly after mapping began in 1976 an interesting image taken by the Viking 1 Orbiter was received at the Jet Propulsion Laboratory, Pasadena, CA, which contained a surface feature resembling a human or ape-like face. The photo was immediately released to the public as an interesting geological feature and dubbed the "Face on Mars." Shortly afterwards other photos of the same area were taken, and some scientists believed that the formation appeared to be a face due to the lighting angles as seen from the Orbiter.

Origin Of Features Examined

Over the years, some people began to raise questions about the origins of the features. A few ideas and theories arose speculating that the features may have been built by aliens in the distant past. These theories are based largely on the results of computer photo enhancements and other analytical techniques performed on the Viking images beginning in the early 1980s.

Most planetary geologists familiar with the set of photos, however, concluded that the natural processes known to occur on Mars—such as wind erosion, Mars quakes, and erosion from running water in the distant past—could account for the formation of the complicated fretted terrain of the Cydonia region, including the face.

Because the entire data set includes only nine low-to-moderate resolution photos, scientists say that there just is not enough data available to justify what would be an extraordinary conclusion that the features are not natural in origin (many scientists question whether images alone would be enough to settle the matter). Such a proven discovery of extraterrestrial life or artifacts would be one of the greatest discoveries in human history, and, as such, demand the most rigorous scientific investigation.

However, despite the phenomenal nature of such a potential discovery, no one in the scientific community—either in the U.S. or worldwide—has ever proposed an investigation for a mission to study these features. Until more data is gathered, many scientists consider the probability that the features are anything other than natural in origin are just too low to justify the major expenditure of public funds which such an investigation would entail (more on this below).

What is agreed on is that a greater number of high resolution images of this area should be gathered. Following the failure of the Mars Observer mission in August, 1993, NASA proposed a decade-long program of Mars exploration, including orbiters and landers. The program, called Mars Surveyor, would take advantage of launch opportunities about every 2 years to launch an orbiter and a lander to the Red Planet. The first mission, consisting of an orbiter to be launched in 1996, will map the surface

and take high- and medium-resolution images of particular features on the Martian surface that are of high interest. NASA intends to make observations of the Cydonia region making the best effort feasible, either with the first orbiter or on follow-on missions, to obtain images of the “face” and nearby landforms.

Quite aside from the interest generated by these curious features, Cydonia has long been regarded as an area of high scientific importance, ever since the first detailed images were returned by NASA's Viking spacecraft in the late 1970s. The Cydonia region of Mars is part of the so-called fretted terrain, a belt of landforms that circles Mars at about 30–40 degrees North Latitude. In this region, the ancient crust of Mars has been intensely eroded by weathering processes, leaving high remnants of older crust surrounded by lower plains of eroded debris.

The landforms of Cydonia resemble in some respects those of terrestrial deserts, but they probably have been shaped by a unique range of peculiarly martian agencies: wind, frost and possibly running water in ancient times. Deciphering the geological age and origin of this terrain will yield important insights into the evolution of the martian surface, into the role of ice and water in its development and into the nature of the martian climate in times past.

Proposing Investigations

The selection of goals and scientific priorities for NASA to undertake on future space science missions starts in the scientific and academic communities, as well as within NASA. Scientific associations, such as the National Academy of Science, determine the research priorities in any given field of science. For instance, the most important questions remaining about Mars include gaining an understanding of the amount of water on the planet; mapping the surface in detail to gain a complete understanding of the geological processes, history and composition; and gaining a global understanding of the atmosphere, including climate and weather.

When NASA receives permission to proceed with a science mission, the Agency publishes an Announcement of Opportunity (AO). The AO solicits interest in providing high priority scientific investigations and instruments that will be part of the new mission. The AO receives the widest possible circulation throughout the university and research communities and industry.

Proposals are submitted and reviewed through a competitive peer review process. In this process, scientists from various institutions and organizations evaluate each proposal's scientific and technical merit, and then rank the relative merit of each. NASA receives the reports of the review panels and makes a final selection as to which instruments will be built and actually flown. This rational selection process ensures that only the most useful research, with a high probability of returning good science, is done at taxpayer expense.

After selection, each Mars Surveyor Principle Investigator (PI) team will develop its instrument, build it, test it and prepare it for launch and the 10-month journey to Mars. They are also charged with developing, testing, and using the software required to properly calibrate their instrument's data. Most of the scientists working on the various Mars Surveyor missions will have several years invested in their instrument before the spacecraft arrives at Mars and they can actually receive the bulk of the data they have been waiting for.

Obtaining Images of the “Face” and Other Planetary Data

Since the release and subsequent widespread circulation of the 'face' images, scientists and individual members of the public have freely drawn their own conclusions about the nature and origin of this feature. NASA encourages anyone seriously interested in this topic to obtain the photo(s) and decide for themselves, just as every day many hundreds of independent researchers and scientists make use of NASA-provided data on a variety of subjects.

The most noteworthy image of the 'face' feature is available to the public, for a nominal fee, through Headquarters and JPL. A photo catalogue can be provided to select images.

The phone numbers for ordering photos are:
HQ: 202/358-1900
JPL: 818/354-5011

All imaging data obtained by the Mars Surveyor program, as well as other types of data, will be deposited in open data archives. Two such archives widely used are the Planetary Data System (PDS), an open archive accessible to thousands of scientists and other individuals, and the National Space Science Data Center (NSSDC) where images and other data will be readily available to the

general public (generally on CD-ROMs or as hard copy, as appropriate), for a nominal charge that covers the materials and time needed to produce the copies. For information about ordering copies of NASA science mission images, including on CD-ROM format, contact the NSSDC at:

National Space Science Data Center
Request Coordination Center
Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: 301/286-6695

Listed below are the photo numbers of every image taken by Viking of the 'face' feature and the surrounding Cydonia terrain. When ordering from the data archive centers, refer to the Viking picno (photo number).

Picno	Scale (m/pixel)	Emission (deg)	Incidence (deg)	Phase (deg)	Sun Elevation (deg)	Period of Day
035A72	47.13	10.53	79.89	86.26	10.11	morning
070A13	43.42	12.36	62.61	71.77	27.39	morning
561A25	162.7	32.83	76.59	45.63	13.41	morning
753A33	232.82	10.25	35.3	25.12	54.7	afternoon
753A34	232.51	10.13	35.15	25.14	54.85	afternoon
814A07	848.86	38.15	65.93	103.25	24.07	too low
257S69	821.24	42.06	43.83	8.66	46.17	cloudy
673B54	226.02	23.22	64.94	77.76	25.06	morning
673B56	225.7	21.33	67.77	76.7	22.23	morning